

Measurement of Low Transverse Momentum Direct Photons Via External Conversions in Au+Au Collisions at $\sqrt{s} = 200$ GeV with the PHENIX Detector at RHIC

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Abstract

Photons are an important probe of the hot and dense partonic medium created through the collision of heavy ions at RHIC. This is because they escape the medium with little modification and carry information about the earliest stages of the collision, including thermal radiation. It is also predicted that most of the direct photons with $1 < p_T < 3\text{GeV}$ come from the partonic phase, which are hard to measure because of the large background from hadronic decay photons. Dilepton pairs from direct photons are a much cleaner signal in this pT region. Low mass dilepton pairs are identified as originating from photons converting in detector material by observing a peak in the invariant mass distribution. The goal of the analysis is to measure the excess of photons above expected contributions from hadronic decays as a ratio. The dominant π^0 contribution is measured by reconstructing $\pi^0 \rightarrow \gamma + \gamma \rightarrow \gamma + e^+e^-$ decays, with the remaining contributions estimated through simulations. The details of the analysis will be discussed.